a liquid separation column, the column being divided into first and second vertical compartments, the vertical compartments being joined at their lower ends to form a U-tube portion between the compartments, wherein the first and second compartments are in fluid communication;

each vertical compartment including an upper fluid inlet port located in the top of the compartment, the inlet ports being in fluid communication with the interior of the compartments and an external fluid source;

each vertical compartment being equipped with an upper bed disposed inside each compartment, the beds being proximate to the upper end of the compartments and below the inlet ports;

the upper beds having fluid distribution nozzles, wherein fluid received from the inlet ports is directed into the compartments at a controlled flow rate;

each compartment further including an outlet port for backwashing, each outlet port being disposed adjacent to and below each upper bed, wherein the outlet ports remove particulate matter larger than the upper bed nozzle openings;

the U-tube portion between the compartments including a lower fluid inlet port, wherein the lower fluid inlet port is in fluid communication with both the first and second vertical compartments; and;

an adsorbant resin layer disposed within each vertical compartment, wherein a free board is defined between a top level of the adsorbant resin layer and the upper bed in each compartment, whereby the free board allows the resin layer to expand and contract during the liquid separation process.

7. The liquid separation apparatus of claim 6, wherein the vertical compartments further include a sight glass for monitoring the level of the resin layer.

8. A liquid separation process utilizing the apparatus of claim 6, wherein the inlet and outlet ports are in fluid communication with a service fluid supply, a regenerant fluid supply, a backwash fluid supply, and a pump for pumping the service fluid, regenerant fluid, and backwash fluid through the apparatus; the process comprising the steps of:

pumping service fluid through the inlet port of the first compartment down through the adsorbant resin layer of the first compartment and up through the adsorbant layer of the second compartment, the filtered fluid exiting the apparatus through the inlet port of the second compartment;

regenerating the adsorbant resin layers by pumping regenerating fluid though the inlet port of the second compartment down through the adsorbant resin layer of the second compartment and up through the adsorbant layer of the first compartment, wherein the regenerant fluid exits the apparatus through the inlet port of the first compartment; and

backwashing the apparatus when the pressure drop of the service fluid increases to a predetermined level.

9. The liquid separation process of claim 8, wherein the step of backwashing when the pressure drop of the service fluid reaches a predetermined level, comprises:

backwashing the resin in the first compartment by pumping the backwash fluid at a controlled flowrate through the inlet port of the second compartment and outflowing the fluid through the outlet port of the first compartment; and

backwashing the resin at the second compartment by pumping the backwash fluid at a controlled flowrate through the inlet port at the first compartment and outflowing the fluid through the outlet port of the second compartment.

10. The liquid separation process of claim 8, wherein the step of backwashing when the pressure drop of the service fluid reaches a predetermined level, comprises:

backwashing the resin in the first compartment by pumping the backwash fluid at a controlled flowrate through the U-tube inlet port and outflowing the fluid through the outlet port of the first compartment; and

backwashing the resin at the second compartment by pumping the backwash fluid at a controlled flowrate through the U-tube inlet port and outflowing the fluid through the outlet port of the second compartment.

11. The liquid separation process of claim 8, wherein the step of backwashing when the pressure drop of the service fluid reaches a predetermined level, comprises:

opening simultaneously the outlet ports in both the first and second compartments; and

pumping the backwash fluid through the U-tube inlet port and outflowing the backwash fluid through the outlet ports of each compartment.

REMARKS

In response to the Restriction Requirement mailed on June 5, 2001, and the communication mailed on December 21, 2001, claim 6 has been amended and claims 12-14 have been canceled. Claims 6-11 are now pending in this application. Applicant has assumed that the Response to Restriction Requirement and Amendment filed by the applicant on September 5, 2001 was not entered.

In a proposed Amendment to the Drawings submitted concurrently herewith under separate cover, Figures 10A, 10B, 11A and 11B have been canceled. Figure 12 has been replaced with new Figure 10. The new Figure 10 is supported by the specification on pages 6 and 7. Figure